

CLAIMS:

1. An ultrasonic diagnostic apparatus comprising:

an ultrasonic transmitting and receiving unit for transmitting ultrasonic waves to an object to be inspected and  
5 receiving echo waves reflected from the object;

an image processing unit for executing image processing of image data, which is obtained on the basis of the echo waves received by said ultrasonic transmitting and receiving unit, by using image processing condition parameters;

10 an information input unit to be employed for inputting information of object concerned with the object to be inspected;

a parameter memory unit for storing the image processing condition parameters to be used in the image processing unit,  
15 in correspondence with the information of object;

a control unit for reading out the image processing condition parameters, which correspond to the information of object input by employing the information input unit, from said parameter memory unit so as to supply the read-out parameters  
20 to the image processing unit; and

a display unit for displaying an image on the basis of the image data subjected to the image processing in the image processing unit.

2. An ultrasonic diagnostic apparatus according to claim 1,  
25 wherein:

said parameter memory unit stores a plurality of image processing condition parameter sets in correspondence with one item of the information of object; and

said information input unit is employed for inputting the  
5 information of object and for selecting an image processing condition parameter set from among the plurality of image processing condition parameter sets corresponding to the information of object.

3. An ultrasonic diagnostic apparatus according to claim 1,  
10 wherein the image processing condition parameters to be used in the image processing unit prescribe a control of at least one of a gradation control process, a response control process, a scale-up process, a scale-down process and an interpolation process for the image data.

15 4. An ultrasonic diagnostic apparatus according to claim 1, further comprising:

a three-dimensional image construction unit for constructing three-dimensional image data on the basis of the image data subjected to the image processing in the image  
20 processing unit so as to output the three-dimensional image data to said display unit.

5. An ultrasonic diagnostic apparatus according to claim 1, wherein said ultrasonic transmitting and receiving unit includes:

25 a plurality of ultrasonic detecting elements, arrayed in

a two-dimensional shape, for modulating light entered from a light source, on the basis of the echo waves applied thereto.

6. An ultrasonic diagnostic apparatus comprising:

an ultrasonic transmitting and receiving unit for  
5 transmitting ultrasonic waves to an object to be inspected and receiving echo waves reflected from the object, in accordance with ultrasonic transmission/reception conditions which are set on the basis of transmission/reception condition parameters;

10 an image processing unit for executing image processing of image data, which is obtained on the basis of the echo waves received by said ultrasonic transmitting and receiving unit, by using image processing condition parameters;

an information input unit to be employed for inputting  
15 information of object concerned with the object to be inspected;

a parameter memory unit for storing the image processing condition parameters to be used in the image processing unit and the transmission/reception condition parameters to be used  
20 in said ultrasonic transmitting and receiving unit, in correspondence with the information of object;

a control unit for reading out at least either of the image processing condition parameters and the transmission/reception condition parameters, which  
25 correspond to the information of object input by employing the

information input unit, from said parameter memory unit so as to supply the read-out parameters to at least one of the image processing unit and said ultrasonic transmitting and receiving unit; and

5           a display unit for displaying an image on the basis of the image data subjected to the image processing in the image processing unit.

7.    An ultrasonic diagnostic apparatus according to claim 6, wherein:

10           said parameter memory unit stores a plurality of image processing condition parameter sets and a plurality of transmission/reception condition parameter sets in correspondence with one item of the information of object; and

          said information input unit is employed for inputting the  
15   information of object and for selecting an image processing condition parameter set from among the plurality of image processing condition parameter sets corresponding to the information of object and selecting a transmission/reception condition parameter set from among the plurality of  
20   transmission/reception condition parameter sets corresponding to the information of object.

8.    An ultrasonic diagnostic apparatus according to claim 6, wherein image processing condition parameters to be used in the image processing unit prescribe a control of at least one  
25   of a gradation control process, a response control process,

a scale-up process, a scale-down process and an interpolation process for the image data.

9. An ultrasonic diagnostic apparatus according to claim 6,  
wherein ultrasonic transmission/reception condition  
5 parameters to be used in said ultrasonic transmitting and  
receiving unit prescribe a control of at least one of a center  
frequency, a bandwidth, and a focussing position, transmission  
power and reception sensitivity for the echo waves.

10. An ultrasonic diagnostic apparatus according to claim 6,  
10 further comprising:

a three-dimensional image construction unit for  
constructing three-dimensional image data on the basis of the  
image data subjected to the image processing in said image  
processing unit so as to output the three-dimensional image  
15 data to said display unit.

11. An ultrasonic diagnostic apparatus according to claim 6,  
wherein said ultrasonic transmitting and receiving unit  
includes:

a plurality of ultrasonic detecting elements, arrayed in  
20 a two-dimensional shape, for modulating light entered from a  
light source, on the basis of the echo waves applied thereto.

12. An ultrasonic diagnostic apparatus comprising:

an ultrasonic transmitting and receiving unit for  
transmitting ultrasonic waves to an object to be inspected and  
25 receiving echo waves reflected from the object;

an image analysis unit for analyzing image data obtained on the basis of the echo waves received by said ultrasonic transmitting and receiving unit, thereby to calculate normalization parameters;

5 an image processing unit for executing a normalization process of the image data obtained on the basis of the echo waves received by said ultrasonic transmitting and receiving unit, in accordance with a normalization rule by using the normalization parameters calculated by said image analysis  
10 unit, and for executing image processing of the image data by using image processing condition parameters;

an information input unit to be employed for inputting information of object concerned with the object to be inspected;

15 a memory unit for storing the normalization rules and the image processing condition parameters to be used in the image processing unit, in correspondence with the information of object;

a control unit for reading out the normalization rule and  
20 the image processing condition parameters, which correspond to the information of object input by employing the information input unit, from said memory unit so as to supply the read-out rule and parameters to the image processing unit; and

a display unit for displaying an image on the basis of  
25 the image data subjected to the image processing in the image

processing unit.

13. An ultrasonic diagnostic apparatus according to claim 12,  
wherein:

said memory unit stores a plurality of normalization  
5 rules and a plurality of image processing condition parameter  
sets in correspondence with one item of the information of  
object; and

said information input unit is employed for inputting the  
information of object and for selecting a normalization rule  
10 from among the plurality of normalization rules corresponding  
to the information of object and selecting an image processing  
condition parameter set from among the plurality of image  
processing condition parameter sets corresponding to the  
information of object.

15 14. An ultrasonic diagnostic apparatus according to claim 12,  
wherein the image processing condition parameters to be used  
in said image processing unit prescribe a control of at least  
one of a gradation control process, a response control process,  
a scale-up process, a scale-down process and an interpolation  
20 process for the image data.

15. An ultrasonic diagnostic apparatus according to claim 12,  
further comprising:

a three-dimensional image construction unit for  
constructing three-dimensional image data on the basis of the  
25 image data subjected to the image processing in said image

processing unit so as to output the three-dimensional image data to said display unit.

16. An ultrasonic diagnostic apparatus according to claim 12, wherein said ultrasonic transmitting and receiving unit  
5 includes:

a plurality of ultrasonic detecting elements, arrayed in a two-dimensional shape, for modulating light entered from a light source, on the basis of the echo waves applied thereto.

17. An ultrasonic diagnostic apparatus comprising:  
10 an ultrasonic transmitting and receiving unit for transmitting ultrasonic waves to an object to be inspected and receiving echo waves reflected from the object, in accordance with ultrasonic transmission/reception conditions which are set on the basis of transmission/reception condition  
15 parameters;

an image analysis unit for analyzing image data obtained on the basis of the echo waves received by said ultrasonic transmitting and receiving unit, thereby to calculate normalization parameters;

20 an image processing unit for executing a normalization process of the image data obtained on the basis of the echo waves received by said ultrasonic transmitting and receiving unit, in accordance with a normalization rule by using the normalization parameters calculated by said image analysis  
25 unit, and for executing image processing of the image data by



using image processing condition parameters;

an information input unit to be employed for inputting information of object concerned with the object to be inspected;

5 a memory unit for storing the normalization rules and the image processing condition parameters to be used in said image processing unit and the transmission/reception condition parameters to be used in said ultrasonic transmitting and receiving unit, in correspondence with the information of  
10 object;

a control unit for reading out at least either of the normalization rule and the image processing condition parameters, which correspond to the information of object input by employing said information input unit, from said  
15 memory unit so as to supply at least either of the read-out rule and the read-out parameters to said image processing unit, and for reading out the transmission/reception condition parameters, which correspond to the information of object, from said memory unit so as to supply the read-out parameters  
20 to said ultrasonic transmitting and receiving unit; and

a display unit for displaying an image on the basis of the image data subjected to the image processing in said image processing unit.

18. An ultrasonic diagnostic apparatus according to claim 17,  
25 wherein:

said memory unit stores a plurality of normalization rules, a plurality of image processing condition parameter sets and a plurality of transmission/reception condition parameter sets in correspondence with one item of the  
5 information of object; and

said information input unit is employed for inputting the information of object and for selecting that a normalization rule from among the plurality of normalization rules corresponding to the information of object and selecting an  
10 image processing condition parameter set from among the plurality of image processing condition parameter sets corresponding to the information of object and selecting a transmission/reception condition parameter set from among the plurality of transmission/reception condition parameter sets  
15 corresponding to the information of object.

19. An ultrasonic diagnostic apparatus according to claim 17, wherein the image processing condition parameters to be used in said image processing unit prescribe a control of at least one of a gradation control process, a response control process,  
20 a scale-up process, a scale-down process and an interpolation process for the image data.

20. An ultrasonic diagnostic apparatus according to claim 17, wherein the ultrasonic transmission/reception conditions to be used in said ultrasonic transmitting and receiving unit  
25 prescribe a control of at least one of a center frequency, a

bandwidth, and a focussing position, a transmission power and a reception sensitivity for the ultrasonic waves.

21. An ultrasonic diagnostic apparatus according to claim 17, further comprising:

5       a three-dimensional image construction unit for constructing three-dimensional image data on the basis of the image data subjected to the image processing in said image processing unit so as to output the three-dimensional image data to said display unit.

10   22. An ultrasonic diagnostic apparatus according to claim 17, wherein said ultrasonic transmitting and receiving unit includes:

      a plurality of ultrasonic detecting elements, arrayed in a two-dimensional shape, for modulating light entered from a light source, on the basis of the echo waves applied thereto.

23. An ultrasonic diagnostic apparatus comprising:

      an ultrasonic transmitting and receiving unit for transmitting ultrasonic waves to an object to be inspected and receiving echo waves reflected from the object;

20       a region setting unit to be employed for setting a desired region within a displayed image;

      an image analysis unit for analyzing image data obtained on the basis of the echo waves received by said ultrasonic transmitting and receiving unit, as to the desired region set  
25   by employing said region setting unit;

an image processing unit for executing image processing of the image data obtained on the basis of the echo waves received by said ultrasonic transmitting and receiving unit;

an information input unit to be employed for inputting  
5 at least one of information of object concerned with the object to be inspected and image processing rule information concerned with a rule of the image processing;

a parameter memory unit for storing parameters concerned with at least either of transmission/reception conditions to  
10 be used in said ultrasonic transmitting and receiving unit and image processing conditions to be used in said image processing unit, in correspondence with at least one of the information of object and the image processing rule information;

a control unit for controlling at least one of  
15 transmission/reception operation of said ultrasonic transmitting and receiving unit and image processing operation of said image processing unit, in accordance with analytical results in said image analysis unit and the parameters corresponding to at least one of the information of object and  
20 the image processing rule information input to said information input unit; and

a display unit for displaying an image on the basis of the image data subjected to the image processing in said image processing unit.

25 24. An ultrasonic diagnostic apparatus according to claim 23,

further comprising:

a three-dimensional image construction unit for constructing three-dimensional image data on the basis of the image data subjected to the image processing in said image processing unit so as to output the three-dimensional image data to said display unit.

25. An ultrasonic diagnostic apparatus according to claim 23, wherein the ultrasonic transmission/reception conditions to be used in said ultrasonic transmitting and receiving unit prescribe a control of at least one of a center frequency, a bandwidth, and a focussing position, a transmission power and a reception sensitivity for the ultrasonic waves.

26. An ultrasonic diagnostic apparatus according to claim 23, wherein the image processing conditions to be used in said image processing unit prescribe a control of at least one of a gradation control process, a response control process, a scale-up process, a scale-down process and an interpolation process for the image data.

27. An ultrasonic diagnostic apparatus according to claim 23, wherein said ultrasonic transmitting and receiving unit includes:

a plurality of ultrasonic detecting elements, arrayed in a two-dimensional shape, for modulating light entered from a light source on the basis of the echo waves applied thereto.